**环境学院**

攻读博士学位国际学生培养方案

（适用于2017级国际博士生）

**一、适用学科、专业**

环境科学与工程（Environmental Science and Engineering, 一级学科，工学门类，学科代码：0830）

**二、学分要求**

攻读博士学位期间，研究生需获得学位要求学分不少于16学分，其中公共必修课程学分不少于4学分，学科专业课程不少于7学分（其中基础理论课不少于3学分、本学科或相关专业基础理论和专业课程不少于4学分），必修环节学分不少于5学分。自学课程学分另记。

**三、课程设置**

**1. 公共必修课程（4学分）**

初级汉语／汉语 2学分（考试）

“中国概况课”课组课程 2学分（考试）

（汉语课程要求：根据入学时汉语水平测试成绩，选择相应水平的汉语课程）

**2. 学科专业课程（≥7学分）**

（1）基础理论课（从下列课程中选择，≥3学分）

高等数值分析 60420024 4学分（考试）

高等环境化学 70050323 3学分（考试）

环境生物技术原理 70050313 3学分（考试）

环境学院、化学系、化工系、生物系、水利系、土木系等开设的相关专业研究生基础理论课程

（2）本专业或相关专业基础理论和专业课程（≥4学分，在导师指导下选择）

生物膜基础与应用 80050422 2学分（考查）

高级废水处理工程 80050233 3学分（考查）

高等给水工程 80050203 3学分（考试）

高等管网系统与管理 80050193 3学分（考试）

空气污染化学 80050333 3学分（考试）

空气污染控制技术 80050283 3学分（考试）

固体废物综合管理 80050273 3学分（考试）

危险废物处置技术 80050263 3学分（考试）恢复生态学及其应用 80050243 3学分（考试）

全球环境问题 80050253 3学分（考查）

环境传质学 70050332 2学分（考试）

大气化学传输模型 70050353 3学分（考试）

环境学院开设的其他中文或英文研究生课程

**3必修环节（5学分）**

文献综述与选题报告 99990041 1学分（考查）

学术活动与学术报告 99990032 2学分（考查）

资格考试 99990061 1学分（考试）

社会实践（可不选修，用其它专业课替代） 69990041 1学分（考查）

**4、自学课程**

涉及与研究课题有关的专门知识，由导师指定内容系统地自学，可列入个人培养计划。

**5、补修课程**

凡在本门学科上欠缺硕士层次业务基础的博士研究生，一般应在导师指导下补修有关课程。补修课程可记非学位课程学分。

**四、主要培养环节及有关要求**

1、制定个人课程学习计划

博士生入学后三周内，在导师指导下制订个人课程学习计划，并报院（系、所）研究生主管部门备案。执行计划过程中，如因特殊情况需要变动，须在每学期选课期间修改。修改后的课程学习计划，经导师签字后送学院研究生主管部门备案。

2、文献综述与选题报告

入学后在导师指导下，查阅文献资料，深入调查研究，确定具体课题，并尽早完成选题报告。文献阅读量不得少于20篇，选题报告应包含文献综述、论文选题及其意义、主要研究内容、工作特色及难点、预期成果及可能的创新点等。选题报告在一级学科或跨部分二级学科范围内进行，每年组织三次，分别安排在二月、五月、九月底。由博士导师为主组成的考核小组评审。选题报告应吸收有关导师和研究生参加，跨学科的论文选题应聘请相关学科的导师参加。若学位论文课题有重大变动，应重新作选题报告，以保证课题的前沿性和创新性。评审通过的选题报告，应以书面形式交研究生科备案。

3、博士生资格考试

博士生在入学后第二学期末或第三学期初进行博士生资格考试。

博士生资格考试采取口试方式进行。口试按学科方向由博士生导师组织实施，考核小组由3~5名教师（要求至少有3名博导参加）组成。考核小组在听取博士生的汇报（内容包括学习情况、选题方向以及相关领域的学术前沿等）的基础上，就学科理论基础、专业知识以及学科前沿问题等进行提问，并填写考核意见，给出考核成绩。

资格考试不通过的博士生可以在下一学期或以后的学期再申请参加考试。

4、社会实践

按《清华大学博士生必修环节社会实践管理办法》执行。

5、学术活动与学术报告

实行博士生学术报告制度。博士生在论文工作期间每学期至少在二级学科范围内做1次学术报告，至少有1次在全国性或国际学术会议上宣读自己撰写的学术论文，博士生在学期间应参加30次以上学术报告（采用IC卡记录方式考核），其中两次以上为跨二级学科的学术报告。

6、论文中期检查

学位论文实行中期检查制度。在研究生学位论文工作的中期按二级学科或跨部分二级学科组织考核小组对研究生的综合能力、论文工作进展状况以及工作态度、精力投入等进行全方位的考查。通过者，准予继续进行论文工作。论文中期检查可与学术报告统筹安排。

7、学术论文发表或科研成果的要求

博士生在学期间至少发表与博士论文相关的SCI收录论文2篇，或SCI收录论文1篇和EI收录论文2篇，或影响因子大于2.0 的SCI收录论文1篇。其中在影响因子低于0.5的SCI收录论文按EI收录论文计算。

8、最终学术报告

在博士学位论文工作基本完成以后，最迟应于正式申请答辩前3个月，做1次论文工作总结报告。环境学院每三个月开展一次最终学术报告，分别于每年的3月、6月、9月、12月。具体要求见《清华大学攻读博士学位研究生培养工作规定》。

9、国际学术活动环节

博士生在学期间应积极参加国际学术活动，且至少满足以下1项条件：

（1）参加1次国际学术会议（双边会议除外），并在会议上做口头报告。

（2）参加校、系组织的国际化实践环节，累计时间不少于2周。

（3）选修校、系开设的用英语开设的专业相关课程不低于1学分，且通过考核。

五、学位论文工作及要求

1、博士学位论文是博士生培养质量和学术水平的集中反映，应在导师指导下由博士生独立完成。

2、博士学位论文应是系统完整的学术论文，应在科学上或专门技术上做出创造性的研究成果，应能反映出博士生已经掌握了宽广的基础理论和系统深入的专门知识，具备了独立从事研究或教学的能力。

3、学位论文工作时间一般为2年（选题报告通过之日起至论文评阅前止）以上。

**School of Environment**

Ph.D. Program for International Students

Ⅰ Subject and Major

Environmental Science and Engineering

Ⅱ Credits Requirement

During the study for Ph.D. degree, at least 16 credits are demanded to acquire the degree, which includes at least 4 credits for public compulsory courses, no less than 7 credits for subjective specialized courses （containing at least 3credits for basic theory courses and no less than 4credits for basic theory and specialized courses of the subject or other relevant major）, as well as at least 5 credits for compulsory study course. Self-study courses excluded.

Ⅲ Curriculum Plan

**1. Public Compulsory Courses (4 credits)**

Elementary Chinese／Chinese 2 credits (examination)

Chinese Culture and Society 60610082 2 credits (examination)

Requirement for Chinese courses: level of Chinese courses should be selected based on grade of the Chinese level test taken when entering the university.

**2. Subjective Specialized Courses (≥7 credits)**

**(1) Basic theory courses (selection from the following courses ≥4 credits)**

Advanced Numerical Analysis 60420024 4 credits (examination)

Advanced Environmental Chemistry 70050182 2 credits (examination)

Fundamentals of Environmental Biotechnology 70050313 3 credits (examination)

Other relevant basic theory courses offered by chemistry department, chemical engineering department, biology department, department of hydraulic engineering, department of civil engineering for graduate students

**(2) Basic theory courses and specialized course of the subject or other relevant subjects (≥4 credits, selection under the guidance of supervisor)**

Biofilms: fundamentals to applications 80050422 2 credits (examination)

Advanced Wastewater Treatment Engineering 80050233 2 credits (Examination)

Introduction to Sustainable Development 90050012 2 credits (examination)

Advanced Water Supply Engineering 800502033 3 credits (examination)

Advanced Water Distribution System and Management 80050193 3 credits (examination)

Air Pollution Chemistry 80050333 3 credits (examination)

Air Pollution Control Technology 80050283 3 credits (examination)

Integrated Solid Waste Management 80050273 3 credits (examination)

Hazardous Waste Disposal Technology 80050263 3 credits (examination)

Restoration Ecology and Application 80050243 3 credits (examination)

Global Environmental Issues 80050253 3 credits (investigation)

Environmental Transport Processes 70050332 2 credits (examination)

Atmospheric Chemical Transport Model 70050353 3 credits (examination)

Other Chinese or English graduate student courses offered by Department of Environmental Science and Engineering

**(3) Compulsory Study (5 credits)**

Literature Review and Research Proposal 69990021 1 credits (investigation)

Seminars 99990032 2 credits (investigation)

Qualifying Exam 99990061 1 credits (examination)

Social Practice (substitutable with other specialized courses) 69990041 1 credits (investigation)

1. **Self-study courses**

Systematic self-study on research topic related specialized knowledge should be developed under the guidance of supervisor, which can be listed into Ph.D. program.

1. **Restudy courses**

All Ph.D. students lack of master level basis to the subject should restudy relevant courses under the guidance of supervisor. Restudy courses could be listed in the non-degree courses.

Ⅳ Main Process and Related Demand

Same as the Ph.D. program for normal Ph.D.

**1.Formulate Curriculum Plan**

Ph.D. students should formulate curriculum plan under supervisor’s guidance within three weeks after enrollment and should hand in the hard copy plan to the department in charge of graduate students. If changed is needed to the curriculum plan, it should be done during course selection period of the semester. After the changes, students should hand in the plan again with supervisor’s signature.

**2. Dissertation Proposal**

A dissertation proposal must be presented and approved at least twelve months before the dissertation defense. The proposal should include literature review, selection of topic and the significance, main research contents, characteristics and difficulties, expected results and possible innovations. The proposal should be prepared in consultation with the dissertation committee. The outcome of the proposal defense is decided by the dissertation committee. Potential outcome include failure and pass. Successful completion of the dissertation proposal defense is a significant milestone towards completion of the Ph.D. degree.

**3. Qualifying Examination**

The intent of the qualifying examination is to ascertain the breadth of the student’s comprehension of fundamental facts and principles that apply in their major fields of study and whether the students has the ability to think incisively and critically about the theoretical and the practical aspects of these fields. The examiners should satisfy themselves, by unanimous vote, that the student demonstrated sufficient content command and ability to design and produce an acceptable dissertation. The examination will ordinarily be taken in the second (students with master’s degree) or forth (students without master’s degree) semester of the doctoral program, and passing of the examination gives students the advancement to candidacy.

**4. Social Practice**

It should be implemented according to The Social Practice of Required Steps Regulation for graduate students in Tsinghua University.

**5. Academic Activities and Reports**

Graduate students should construct an academic report at least once a semester and should at least once read out his or her own academic paper in national or international academic conferences. Graduate students should attend at least 30 academic reports(seminar) which will be recorded with ID cards during study time.

**6. Dissertation midterm investigation**

Academic papers implement midterm investigate system. In the middle of the work of postgraduate degree thesis, we will conduct a comprehensive examination on the comprehensive ability, the attitude and hardworking of postgraduates as well as the progress of the paper work based on two disciplines or the two-level disciplines examining group. postgraduates who pass the examination can continue to work on the paper. Interim examination of papers can be coordinated with academic reports.

**7. Requirements for publications**

Graduate students should publish 2 SCI papers or 1 SCI paper and 2 EI papers or 1 SCI paper with the IF >2.0. SCI papers with IF<0.5 will be regarded as EI papers.

**8. Dissertation of Defense**

The dissertation defense will occur after completing the committee’s requirements. It is required that the Ph.D. dissertation leads to published papers on peer-reviewed journals with at least 2.0 of impact factors in total for review prior to scheduling a Ph.D. dissertation defense. Doctoral defenses are open to the public. Candidates are required to submit the details (date, time location) of the meeting, a dissertation abstract, and a listing of all committee members to the administrative staff prior to the scheduled defense. Potential outcomes include failure and a pass, and are decided by majority vote of the committee. Failure of the thesis defense requires that a student substantially rework the dissertation and defend the modified dissertation within twelve months. Candidates passing the dissertation defense are typically required to modify the dissertation as directed by the committee. In either case the candidate will be informed of the outcome in a meeting with the supervisor.

**9. International academic activities**

PhD students should actively participate in international academic activities during school, and at least meet one of the following requirements:

1. Participate one international academic conference (except bilateral meeting) with oral presentation.
2. Participate international practical activities hold by Tsinghua University or School of Environment and last for at least 2 weeks.
3. Take specific relative English graduate student courses which is at least 1 credit offered by Department of Environmental Science and Engineering and pass the examination or investigation.

Remark: this Ph.D. program was discussed and approved by degree committee of Department of Environmental Science and Engineering on Jun.19th.2009, and should be applied for international Ph. D student who entered school after Jun.19th.2009.

V Main Process and Related Demand

1. The dissertation represents the quality and academic level of postgraduates. It should be finished by postgraduates independently under the guidance of supervisor.
2. The dissertation should be systematically complete academic thesis which should be creative on science or techniques. And it represents that postgraduates have already had wide basic knowledge background and systematically intensive professional knowledge as well as ability of research and education.
3. Dissertation is about at least 2 year work.