

# 安全科学与工程留学研究生培养方案(2020 版)

## Postgraduate Programs for International Students Majoring in

### Safety Science and Engineering (2020 version)

(学科代码: 0837)

(Subject code: 0837)

#### 一、培养目标

##### I. Program objectives

本学科培养具有坚实系统的火灾及其相关公共安全基础理论知识、较强的解决实际问题的能力、了解安全科学与工程专业发展的前沿和动态、从事安全科学与工程领域的研究、教学、设计、管理的高级人才。

This discipline cultivates senior talents with solid and systematic basic theoretical knowledge of fire and related public safety, strong ability to solve practical problems, understanding the frontier and dynamic development of safety science and engineering, and engaging themselves in research, teaching, design, and management of safety science and engineering.

#### 二、主要研究方向

##### II. Main research fields

1. 火灾动力学演化: 重点研究火灾孕育、发生和发展乃至突变

成灾的自然过程，探索火灾烟气及其毒害物质的生成与传输规律，建立体现火灾复杂性（多维、非定常、非线性等）的理论模型。

**Dynamic behavior rules of fire phenomena:** focus on the natural process of fire formation, occurrence, development, and even cataclysm, explore the generation and transmission rules of fire smoke and its toxic substances, and establish theoretical models that reflect the complexity of fire (multi-dimensional, unsteady, nonlinear, etc.).

2. 火灾防治关键技术：重点研究清洁阻燃、智能探测和清洁高效灭火等火灾防治关键技术原理，发展新一代主动式火灾防治技术，为修订和制订火灾安全技术标准与规范提供技术支撑。

**Key technology of fire prevention and control:** to focus on the research of key technology principles of fire prevention and control, such as clean flame retardant, intelligent detection and efficient fire suppression, develop a new generation of active fire prevention and control technology, and provide technical support for revising and formulating technical standards and norms of fire safety.

3. 火灾安全工程理论及方法学：重点研究火灾系统和外界环境的相互作用，发展火灾环境下的人群疏散模型，建立耦合火灾动力学和统计理论的火灾风险评估方法学，为新兴的火灾安全性能化设计提供理论基础与工程方法。

**Fire safety engineering theory and methodology:** focus on the interaction between fire system and external environment, develop crowd evacuation

models under fire environment, establish fire risk assessment methodology coupled with fire dynamics and statistical theory, and provide theoretical basis and engineering methods for emerging performance-based fire safety design.

4. 公共安全应急理论及方法：重点研究公共安全事件孕育、发生、发展到突变成灾的演化规律及其致灾机理，发展公共安全事件耦合与衍生机理及事件链理论以及承灾载体风险评价与承灾能力优化方法，结合大数据和人工智能，研究公共安全事件预防、监测、预警和应急救援过程的关键技术原理，建立公共安全事件应急决策理论和方法。

Theory and method of public safety emergency: Focus on the evolution law of public safety incident from its formation, occurrence, and development and its disaster-causing mechanism, develop coupling and derivative mechanism of a public safety incident and event chain theory, and risk assessment of hazard-affected carriers and optimization methods of hazard-affected capacity, combined with Big Data and artificial intelligence, study the key technology of principle of its prevention, monitoring, early warning, and emergency rescue process, establish the theory and method of an emergency decision of public safety incident.

### 三、课程类型和学分要求

### III. Course type and credit points requirements

1. 公共必修课类型及学分要求：按照国际学院有关规定执行，具体要求请参照附件。

1.Types and credit point requirements of public compulsory courses: They shall be implemented in accordance with relevant regulations of International College. Please refer to the attachment for specific requirements.

2. 专业课程类型及学分要求

Types of specialized courses and credit points requirements

1) 硕士培养模式。通过硕士留学生资格审查和招生面试，取得我校硕士研究生资格者。留学生在申请硕士学位时，取得的总学分不低于 35 学分(含公共必修课学分)，其中硕士学科和专业基础课不少于 12 学分，开题报告 2 学分。

1) Master's program: Applicants are supposed to pass the qualification examination and the recruitment interview of the university to obtain the qualification for master's program. For master's degree application, the total credit points obtained shall not be less than 35 credit points (that of public compulsory courses included), including at least 12 credit points for basic courses and specialized basic courses, and 2 credit points for research proposal.

2) 博士培养模式。已取得硕士学位，通过我校博士生资格考核

者。留学生在申请博士学位时，取得的总学分不低于 12 学分（含公共必修课学分），其中博士专业课不少于 4 学分，开题报告 2 学分。

2) **Doctoral program:** Applicants are supposed to obtain a master's degree and pass the examination of doctoral qualification of the university. When applying for the doctoral degree, the total credit points obtained should not be less than 12 credit points (that of public compulsory courses included), including at least 4 credit points for doctoral specialized courses and 2 credit points for research proposal.

#### 四、研究生培养过程要求

#### **IV. Requirements for master students**

1. 开题报告：研究生学位论文的开题报告及评审过程是研究生培养的必要环节。开题报告的时间由研究生导师根据研究生工作进度情况确定，硕士生一般应在硕士培养阶段的第三或第四学期内完成，博士生一般在取得博士生资格后的第二学期末或第三学期初完成；研究生学位论文开题报告评审小组由本学科及相关学科的专家组成，评审小组主席须为正高级职称。硕士生开题报告评审小组由不少于 3 名副高及以上职称人员组成，博士生开题报告评审小组人数不少于 5 人（其中具有正高级职称的博士生导师不少于 3 人）；达到或超过三分之二的评审专家同意通过的方可通过；开题报告不通过的硕士或博士研究生可以申请在下一学期重新开题。

1. **Research proposal:** The research proposal and review process of the

dissertation of postgraduates is a necessary part of postgraduate education. The time of the research proposal is determined by the supervisor of postgraduates according to the progress of postgraduates' work. The master's degree should normally be completed within the third or fourth semester of the master's education, and the doctoral degree normally at the end of the second or beginning of the third semester after obtaining the doctoral qualification; the review group of the research proposal of the postgraduates' dissertation shall be composed of experts of the same discipline or related disciplines, and the chairman of the review group shall have a senior professional title. The review group of the research proposal for master students shall consist of at least three persons with associate senior title or above, and the review group of the research proposal for doctoral degree students shall consist of at least five persons (including at least three doctoral supervisors with senior professional title); Research proposal shall be adopted only if it is approved of by two thirds or more of the experts. Those postgraduate students or doctoral students who fail to pass the research proposal could apply the second time in the next semester.

2. 中期检查: 博士研究生中期检查应在通过开题报告一年之后进行; 博士学位论文中期检查报告评审小组的组成及通过办法同开题报告; 中期检查不通过的博士研究生可以申请在下一学期再次进行中期检查。

2. Mid-term inspection: The mid-term inspection for doctoral students

should be carried out one year after the research proposal approval; The composition of the review group of the mid-term inspection report of the doctoral dissertation and the approval standard are the same as those of the research proposal; Doctoral students who do not pass the mid-term inspection could apply for the second mid-term inspection in the next semester.

3. 预答辩: 博士研究生学位论文的预答辩是研究生培养的必要环节。由本学位点统一组织, 原则上每年 3 月和 9 月进行, 所有博士研究生必须参加预答辩评审。预答辩评审小组实行导师回避制。预答辩前, 博士研究生需提供博士论文全稿。专家评委实名投票以确定是否满足博士研究生论文要求, 合格票数不少于专家总票数的 2/3 方能通过预答辩, 经预答辩确定不予通过的博士论文需延期, 且需再次参加预答辩。预答辩专家组成员要求同开题报告。

3.Pre-defense: The pre-defense of the dissertation of doctoral students is a necessary part of the post-graduates education. The pre-defense is organized by its degree program in March and September every year, and all doctoral students must attend the pre-defense. The pre-defense review group shall implement the system of supervisor avoidance. Before attending the pre-defense, doctoral students are required to provide a full draft of their doctoral dissertation. The experts will vote by name to determine whether the requirements of the doctoral thesis are met, and the number of qualified votes will be at least 2/3 of the total number of experts

to pass the pre-defense. The dissertation will be postponed if the pre-defense is not approved, and one more pre-defense is required. The requirements for members of the Pre-Defense review group are the same as those for the research proposal.

4. 毕业答辩：研究生在获得硕士或博士学位之前须参加学位论文的毕业答辩，具体要求参见研究生院的相关规定。

4. Graduation defense: Graduate students are required to complete the dissertation defense before obtaining their master's or doctoral degrees. For specific requirements, please refer to the relevant regulations of Graduate School.

## 五、 选课要求和课程设置列表

### **V. Course selection requirements and course setting list**

1. 公共必修课由国际学院统一设置和要求。

1. Public compulsory courses are uniformly set and required by International College.

2. 超出学分要求的基础课，学生可以申请调整为专业选修课。

2. For basic courses beyond the credit point requirements, students can apply for turning them into specialized elective courses.

3. 研究生中途由其他专业转入本专业的，应按照本专业课程要求补修课程，已修课程符合本专业要求的，可以计入学位课程专业选修课学分。



3.If a postgraduate student transfers from another major to his present one, the additional courses shall be taken according to the course requirements of the new major. If the completed courses meet the requirements of the new major, they can be included in the credit points for specizlized elective courses of the degree courses.

4. 研究生选修本专业培养方案以外的研究生课程,经导师签字同意,可以算作本专业的专业选修课。

4.With the approval of their supervisors, courses that do not belong to this program could be included in specialized elective courses for their major.

5. 研究生补修本科生课程所获学分不计入学位课程学分。

5.Credit points obtained by postgraduate students in supplementary undergraduate courses will not be counted as the credit points for degree courses.

6. 专业课程设置列表如下。

6.The course list of this major is as follows:

硕士学科基础课: 6 学分

Basic courses for master students: 6 credit points

课程代码 Code	课程名称 Name	学分 Credit points	备注 Note
SAFE6001P	安全科学原理 Principles of Safety Science	3	必修 Compulsory

SAFE6002P	风险评估理论与方法 Risk assessment theory and methodology	3	必修 Compulsory
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硕士专业基础课：22 学分

Specialized basic courses for master students: 22 credit points

课程代码 Code	课程名称 Name	学分 Credit points	备注 Note
SAFE6101P	火灾学 Fire Science II	3	必修 compulsory
SAFE6102P	灭火技术原理及应用 Principle and Application of Fire Extinguishing Technology	3	
SAFE6103P	流动及燃烧的模型与工程应用软件 Flow and Combustion Models and Engineering Applications	3	
SAFE6104P	现代安全监控技术 Modern Safety Monitoring Technology	3	
SAFE6105P	火灾化学 Fire Chemistry	3	
SAFE6106P	火羽流理论	2	

	Theory of Fire plume		
SAFE6107P	阻燃原理及其技术 Flame Retardant Principle and Technology	3	
SAFE6108P	专业英语 Professional English	2	

硕士专业选修课：27 学分

Specialized elective courses for master students: 27 credit points

课程代码 Code	课程名称 Name	学分 Credit points	备注 Note
SAFE6401P	火灾安全工程技术前沿 Frontier of Fire Safety Engineering Technology	2	
SAFE6402P	安全工程材料制备与应用基础 Foundation of Preparation and Application of Safety Engineering Materials	3	
SAFE6403P	能源火灾安全理论及方法学 Energy Fire Safety Theory and Methodology	3	
SAFE6404P	化学品安全性分析原理	3	

	Principles of Chemical Safety Analysis		
SAFE6405P	危险化学品安全概论 Introduction to the Safety of Hazardous Chemicals	2	
SAFE6406P	热自燃理论及其应用 Thermal Spontaneous Combustion Theory and Its Application	2	
SAFE6407P	食品安全学 SAFE6407P Food Safety	2	
SAFE6408P	性能化防火设计方法 Performance-Based Fire Design Methodology	2	
SAFE6409P	火灾信号检测与处理 Fire Signal Detection and Processing	3	
SAFE6410P	人员疏散动力学基础 Fundamentals of Personnel Evacuation Dynamics	2	
SAFE6411P	反应流理论与模拟方法 Reaction Flow Theory and Simulation Methods	3	

博士专业课：12 学分

Doctoral specialized courses: 12 credit points

课程代码	课程名称	学分	备注
Code	Name	Credit points	Note

SAFE7001P	公共安全学 Public Safety	3	
SAFE7002P	安全文化学 Safety Culture Studies	3	
SAFE7003P	智能安全材料基础 Fundamentals of Smart and Safe Materials	3	
SAFE7004P	安全工程数值计算方法 Numerical Methods for Safety Engineering	3	

注：SAFE7001P 和 SAFE7002P 二选一；SAFE7003P 和 SAFE7004P 二选一。

Note: SAFE7001P and SAFE7002P (choose one) ; SAFE7003P and SAFE7004P (choose one) .

## 六、 科研能力要求

### **VI. Requirements for scientific research ability**

按照研究生院有关规定同时满足力学与工程学科学位标准要求。

The student's research ability shall meet both Graduate School's regulations and the degree standard of Mechanics and Engineering discipline.

## 七、 学位论文要求

### **VII. Dissertation requirements**

按照研究生院有关规定。

In accordance with the relevant regulations of Graduate School.

## 八、 其他

### **VIII. Other information**

本培养方案自 2020 级“安全科学与工程”学术学位研究生开始施行，未尽事宜由本学位点负责解释。

This cultivation program will be implemented from the academic degree students of "Safety Science and Engineering" in the class of 2020, and the degree program is responsible for the interpretation of any other matters.

## 附件

### Appendix

#### 留学生公共必修课类型及学分要求

#### **Types and credit requirements of public compulsory courses for international students**

2018 年秋季学期及之前入学的攻读硕士和博士学位的留学研究生的公共必修课为汉语和中国概况课程，其中 CAS-WAS 奖学金（包括 CAS-WAS “一带一路” 奖学金）：《综合汉语》4 学分；《汉语听说》2 学分；《中国概况》4 学分，共 10 学分，每门 75 分及格。其他奖学金（包括 CSC 奖学金、USTC 奖学金）：《基础汉语》2 学分；《中国概况》4 学分，共 6 学分，每门 75 分及格。

Chinese language and China Panorama courses are the public compulsory courses for international graduate students for master's or doctoral degrees who were enrolled in the autumn semester of 2018 and before. For the CAS-WAS scholarship recipients (including CAS-WAS "Belt and Road" scholarship recipients), the credit settings are as follows: *Comprehensive Chinese* (4 Credit Points); *Chinese Listening and Speaking* (2 Credit Points); *China Panorama* (4 Credit Points), 10 Credit Points in total, 75 or more ( $\geq 75$ ) for each pass. For other scholarship recipients (including CSC scholarship recipients and USTC scholarship recipients), the credit settings are as follows: *Basic Chinese*

(2 Credit Points); *China Panorama* (4 Credit Points), 6 Credit Points in total, 75 or more ( $\geq 75$ ) for each pass

2019 年秋季学期及之后入学的攻读硕士和博士学位的留学研究生的公共必修课是汉语和中国概况课程，由国际学院在每年秋季学期集中开设，并负责课程管理。根据国际研究生录取时确定的专业教学语言，公共必修课设置如下：

Chinese language and China Panorama are the public compulsory courses for international graduate students studying for master's or doctoral degrees who were enrolled in the autumn semester of 2019 and after. The courses are offered and administrated by International College in the autumn semester each year. According to their major's teaching language chosen by international graduate students, the public compulsory courses settings are as follows:

1) 以中文为专业教学语言的留学研究生，公共必修课包括：《高级汉语》，4 学分；《中国概况》，4 学分；共计 8 学分，原则上应在入学后第一学期完成。毕业时汉语水平应达到 HSK 五级，并取得相应证书。

1) For international graduate students who choose Chinese as their major's teaching language, the public compulsory courses include:

*Advanced Chinese* (4 Credit Points); *China Panorama* (4 Credit Points).

A total of 8 Credit Points should be obtained in the first semester after



admission in principle. Upon graduation, students should attain HSK Level-5 and obtain its certificate.

2) 以英语为专业教学语言的国际研究生，公共必修课包括：《综合汉语》，2 学分；《汉语听说》，2 学分；《中国概况》，4 学分；共计 8 学分，原则上应在入学后第一学期完成，毕业时汉语水平应达到 HSK 三级，并取得相应证书。

2) For international graduate students who choose English as their major's teaching language, the public compulsory courses include:

*Comprehensive Chinese (2 Credit Points); Chinese Listening and Speaking (2 Credit Points); China Panorama (4 Credit Points).* A total of 8 Credit Points should be obtained in the first semester after admission in principle. Upon graduation, students should attain HSK Level-3 and obtain its certificate.